UNITED STATES AIR FORCE
ABBREVIATED AIRCRAFT ACCIDENT INVESTIGATION BOARD REPORT

MQ-9A, T/N 10-4113

432D WING
CREECH AIR FORCE BASE, NEVADA

LOCATION: NEVADA TEST AND TRAINING RANGE

DATE OF ACCIDENT: 7 JUNE 2016

BOARD PRESIDENT: LT COL BRETT A. WARING

Abbreviated Accident Investigation Conducted Pursuant to Chapter 11 Air Force Instruction 51-503

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
JOINT BASE LANGLEY-EUSTIS VA

OFFICE OF THE VICE COMMANDER
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4 MAY 2017

ACTION OF THE CONVENING AUTHORITY

The Report of the Accident Investigation Board, conducted under the provisions of AFI 51-503, that investigated the 7 June 2016 mishap involving MQ-9A, T/N 10-4113, 432d Wing, Creech Air Force Base, Nevada, complies with applicable regulatory and statutory guidance; on that basis it is approved.

//Signed//

JOHN K. MCMULLEN
Major General, USAF
Vice Commander

EXECUTIVE SUMMARY
ABBREVIATED AIRCRAFT ACCIDENT INVESTIGATION

MQ-9A, T/N 10-4113
NEVADA TEST AND TRAINING RANGE
7 JUNE 2016

On 7 June 2016, at approximately 22:29:47 Greenwich Mean Time (GMT), the remotely piloted mishap aircraft (MA), a MQ-9A, tail number 10-4113, assigned to the 432d Wing, Creech Air Force Base, Nevada and operated by the 26th Weapons Squadron, Nellis AFB, NV, crashed while on a proficiency flight. The MA impacted the ground on U.S. government property. The MA was destroyed at a loss of $11,063,339.00. There were no fatalities, injuries, or damage to civilian property.

The mishap occurred approximately two minutes after aircraft handover from the 432d Wing's Launch and Recovery Element (LRE). At approximately 22:27:11 GMT, the Mishap Crew (MC), comprised of the mishap pilot (MP) and mishap sensor operator (MSO), gained control of the MA at 8,500 feet mean sea level (MSL). Unrecognized by the MC, the programmed minimum altitude (altimeter) was preset at 9,000 feet MSL. At 22:28:19 GMT, when MC executed handover checklist items, they unknowingly engaged the preset altitude and the MA began to climb. MSO advised MP, who was completing handover checklists, of the climb. MP incorrectly believed there was an unexpected flight condition or malfunction. To halt the ascent, MP switched from autopilot to manual mode ("landing configuration"). Landing configuration disables stall protection and auto-adjustments (airspeed and altitude). MP then directed the MA to descend to 8,000 feet MSL. The MP also reduced power to the MA, to avoid acceleration. MP resumed working on the handover checklist. MP had not adjusted the MA nose/pitch, which was positioned upward.

The reduced power and the nose/pitch resulted in a reduced energy state and aircraft stall. MP initially was preoccupied with the handover checklist and did not observe the Heads-Up Display gauges nor the audible and visual stall warnings. MSO advised MP that the aircraft was in a stall condition. MP did not apply the Flight Manual stall recovery procedures, but instead, increased power to the MA, which, due to the weight of the MA and its stalled condition, caused the MA to spiral towards the ground. The MA impacted the ground in the Nevada Test and Training Range (NTTR) at 22:29:20 GMT.

The Abbreviated Accident Investigation Board (AAIB) President found by a preponderance of the evidence the cause of the mishap was the combination of (1) MP's misprioritization to complete the handover checklist, and (2) MP's failure to observe prior warnings of reduced energy state and stall, and timely implement stall recovery procedures. A substantially contributing factor to this mishap was the MC's loss of situational awareness.

SUMMARY OF FACTS AND STATEMENT OF OPINION
MQ-9A, T/N 10-4113
7 June 2016

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

11 ATKS	11th Attack Squadron
26 WPS	26th Weapons Squadron
57 Wing	57th Wing
432 Wing	432d Wing
AAIB	Abbreviated Accident Investigation Board
ACC	Air Combat Command
AF	Air Force
AFB	Air Force Base
AFE	Air Flight Equipment
AFI	Air Force Instruction
AFPAM	Air Force Pamphlet
AFTO	Air Force Technical Order
AGL	Above Ground Level
AOA	Angle of Attack
CAP	Critical Action Process
CAUT	Caution
DoD	Department of Defense
FL	Flight Lead
FPM	Feet Per Minute
FS	Fighter Squadron
ft	Feet
GCS	Ground Control System
GMT	Greenwich Mean Time
HDD	Heads Down Display
Hg	Gravitational Force
HUD	Heads Up Display
IAW	In Accordance With
IP	Instructor Pilot
KIAS	Knots Indicated Airspeed
KTAS	Knots True Airspeed
Lt Col	Lieutenant Colonel
LOS	Line of Sight
LRE	Launch and Recovery Element
LWD	Left Wing Down
MA	Mishap Aircraft
Maj	Major
MAJCOM	Major Command
MC	Mishap Crew
MFL	Mishap Flight Lead
MOA	Military Operating Area
MP	Mishap Pilot
MS	Mishap Sortie
MSA	Minimum Safe Altitude
MSL	Mean Sea Level
MSO	Mishap Sensor Operator
MTS	Multi-Spectral Targeting System
ND	Nose Down
NTTR	Nevada Test and Training Range
NV	Nevada
OG	Operations Group
Ops Tempo	Operations Tempo
ORM	Operational Risk Management
OSS	Operation Support Squadron
PA	Public Affairs
PF	Proficiency Flight
SSgt	Staff Sergeant
TO	Technical Order
T/N	Tail Number
VSI	Vertical Speed
VVI	Vertical Velocity Indicator

The above list was compiled from the Summary of Facts, the Statement of Opinion, the Index of Tabs, and Witness Testimony (Tab V).

SUMMARY OF FACTS

1. AUTHORITY AND PURPOSE

a. Authority

On 9 February 2016, Major General John K. McMullen, Vice Commander, Air Combat Command, appointed Lieutenant Colonel (Lt Col) Brett A. Waring to conduct an Abbreviated Accident Investigation Board (AAIB) to investigate a mishap that occurred on 7 June 2016 involving an MQ-9A, tail number (T/N) 10-4113, in the Nevada Test and Training Range (NTTR) (Tab Y-3, Tab S-4). The abbreviated accident investigation was conducted in accordance with (IAW) Air Force Instruction (AFI) 51-503, *Aerospace and Ground Accident Investigations*, Chapter 11, at Nellis Air Force Base (AFB), Nevada (NV), from 27 February 2017 through 15 March 2017. A legal advisor and a recorder were also appointed to the AAIB (Tab Y-3).

b. Purpose

In accordance with AFI 51-503, *Aerospace and Ground Accident Investigations*, this accident investigation board conducted a legal investigation to inquire into all the facts and circumstances surrounding this Air Force aerospace accident, prepare a publicly releasable report, and obtain and preserve all available evidence for use in litigation, claims, disciplinary action, and adverse administrative action.

2. ACCIDENT SUMMARY

On 7 June 2016, at approximately 2230 Greenwich Mean Time (GMT), the mishap aircraft (MA), an MQ-9A, tail number (T/N) 10-4113, assigned to the 432d Wing (432 WG), Creech Air Force Base (AFB), Nevada (NV) and operated by the 26th Weapons Squadron (26 WPS), 57th Wing (57 WG), Nellis AFB, NV crashed while on a proficiency flight in the NTTR (Tab V-4.1 and Tab V-5.1). The MA impacted the ground on U.S. government property (Tab S-3). The MA was destroyed at a loss of $11,063,339.00 (Tab P-4). There were no fatalities, injuries, or damage to civilian property (Tab Q-6 and S-2).

3. BACKGROUND

a. Units and Organizations

(i) Air Combat Command (ACC)

ACC is a major command of the U.S. Air Force and the primary force provider of combat airpower to America's warfighting commands. To support global implementation of national security strategy, ACC operates fighter, bomber, reconnaissance, battle-management and electronic-combat aircraft. It also provides command, control, communications, and intelligence systems, and conducts global information operations.

As a force provider, ACC organizes, trains, equips, and maintains combat-ready forces for rapid deployment and employment while ensuring strategic air defense forces are ready to meet the challenges of peacetime air sovereignty and wartime air defense. ACC numbered air forces provide the air component to U.S. Central, Southern, and Northern Commands. ACC also augments forces to U.S. European, Pacific, and Strategic Commands (Tab DD-2).

(ii) 12th Air Force

Headquarters 12th Air Force is responsible for the combat readiness of seven active-duty wings and one direct reporting unit. These subordinate commands operate more than 360 aircraft with more than 20,300 uniformed and civilian Airmen. The command is also responsible for the operational readiness of 17 – 12th Air Force-gained wings and other units of the Air Force Reserve and Air National Guard. As the air and space component to U.S. Southern Command, Air Forces Southern conduct security cooperation and provide air, space and cyberspace capabilities throughout Latin America and the Caribbean (Tab DD-6).

(iii) US Air Force Warfare Center

The United States Air Force Warfare Center (USAFWC) exists to ensure deployed forces are well trained and well equipped to conduct integrated combat operations. From our testing and tactics development programs to our training schools and venues, we provide our Airmen with proven and tested technology, the most current tactics, superb academic training and a unique opportunity to practice integrated force employment. The USAFWC vision, mission and priorities are central to supporting the ACC's mission to provide dominant combat airpower for America with warrior Airmen committed to excellence, trained to fly, fight, and win...anytime, any place (Tab DD-9).

(iv) 57th Wing

The 57th Wing, as the most diverse wing in the Air Force, provides advanced, realistic, and multi-domain training focused on ensuring dominance through air, space, and cyberspace. The 57th Wing builds innovative leaders in tactics, training and high-end warfighting to ensure world-wide combat air forces are prepared for tomorrow's victories, while overseeing dynamic and challenging flight operations at Nellis Air Force Base, Nevada. The 57th Wing is comprised of the United States Air Force Weapons School, 57th Maintenance Group, 57th Operations Group, 57th Adversary Tactics Group, USAF Aerial Demonstration Squadron (Thunderbirds), USAF Advanced Maintenance and Munitions Officer School (AMMOS) and the 561st Joint Tactics Squadron (Tab DD-12).

(v) 26th Weapons Squadron

The 26th Weapons Squadron provides expert-level graduates from the US Air Force Weapons School via three courses of instruction; The MQ-9A pilot syllabus, encompassing 339 academic hours, 22 sorties, three simulator missions including training in surface attack, armed interdiction, strike-coordination and reconnaissance, counter-maritime, close air support, dynamic targeting, and combat search and rescue. The MQ-9A Sensor Operator course includes 271 academic hours, 12 sorties and three simulator missions, running concurrently with the pilot syllabus. The Remotely Piloted Aircraft Electronic Combat Officer Course is conducted four times per year, with 29 academic hours, two simulators, and three mission events (Tab DD-16).

(vi) 432d Wing

The 432d Wing and 432d Air Expeditionary Wing "Hunters" consist of combat-ready Airmen who fly MQ-1 Predator and MQ-9 Reaper remotely piloted aircraft in direct support to the joint forces war fighter. The RPA systems provide real-time intelligence, surveillance and reconnaissance, and precision attack against fixed and time-critical targets. The "Hunters" also conduct RPA initial qualification training for aircrew, intelligence, weather, and maintenance personnel. The wing oversees operations of the 432d Operations Group, 432d Maintenance Group, 732d OG, 11th RS, 15th RS, 17th RS, 18th RS, 20th RS, 22d RS, 30th RS, 42d Attack Squadron, 867th RS, 432d Operations Support Squadron, 432d Aircraft Maintenance Squadron, 432d Maintenance Squadron, and 432d Aircraft Communications Maintenance Squadron (Tab DD-18).

(vii) 11th Attack Squadron

Following inactivation in 1994, the 11th Reconnaissance Squadron (RS) was re-designated and reactivated in July 1995. In 1996, it became the first Remotely Piloted Aircraft (RPA) Squadron in the Air Force and provided deployable, long-endurance, aerial reconnaissance, and surveillance while flying the Predator RPA from 1996 through 2002. The 11th RS transitioned to RPA flight training at Creech AFB, NV in 2003, and was redesignated the 11th Attack Squadron on 15 May 2016 (Tab DD-20).

b. Aircraft: MQ-9A Reaper

The MQ-9A Reaper is an armed, multi-mission, medium-altitude, long-endurance remotely piloted aircraft that is employed primarily as an intelligence-collection asset and secondarily against dynamic execution targets. Given its significant loiter time, wide-range sensors, multi-mode communications suite, and precision weapons, it provides a unique capability to perform strike, coordination, and reconnaissance against high-value, fleeting, and time-sensitive targets. Reapers can also perform the following missions and tasks: intelligence, surveillance, reconnaissance, close air support, combat search and rescue, precision strike, buddy-laser, convoy/raid over-watch, route reconnaissance, target development, and

terminal attack guidance. The MQ-9A's capabilities make it uniquely qualified to conduct irregular warfare operations in support of combatant commander objectives (Tab DD-24).

4. SEQUENCE OF EVENTS

a. Mission

The purpose of the mission control element (MCE)'s 7 June 2016 MQ-9A mission was to conduct a proficiency flight (PF) of approximately one hour in duration in preparation for a USAF Weapons School student training flight (Tab V-4.1 to V-4.2 and Tab V-5.1). This was an authorized training flight (Tab AA-2, Tab AA-3, and V-4.2.). During the PF, the mishap crew (MC) was to setup the MA's systems for the training flight (Tab V-4.1).

b. Planning

The MCE's mission planning consisted of standardized mission briefing procedures utilizing 26 WPS Weapons Attack guide, and included weather conditions, special interest items, emergency procedures, and operational notes (Tab V-4.1, Tab V-5.1, Tab AA-5 to Tab AA-7). The mishap pilot (MP) briefed these items prior to the flight (Tab V-4.1 and Tab V-5.1). No supervisory personnel were required to be present for this briefing (Tab AA-7).

c. Preflight

A pre-flight inspection of the MA's maintenance records and inspections was completed and no discrepancies were noted (Tab V-5.2). The MC ran their pre-flight checklist within the Ground Control Station (GCS) and assumed control of the MA from the launching Launch and Recovery Element (LRE) without incident (Tab V-4.1 and Tab V-5.1).

d. Summary of Accident

At approximately 22:27:11 GMT, the MC gained control of the MA from the home station LRE for a proficiency flight (a flight during which the pilot and sensor operator ensure parameters for the aircraft are correct and the aircraft is functioning properly) (Tab V-4.2, and Tab CC-23 to CC-24). The LRE GCS monitored (but had no control over) the MA's flight after handover, through ground impact (Tab CC-5 and Tab V-3.1). Prior to the mission, LRE and MC telephonically discussed pertinent details of their planned handover, but no requirement existed to document or discuss preset minimum altitudes (Tab V-3.2 and Tab V-5.2). At handover, the MA was commanded to hold at 8,500 feet (ft) mean sea level (MSL), at a specified airspeed (Tab CC-5).

The MCE began executing their handover checklist, which involved changing the lost link heading on the presets menu (Tab V-5.2 to V-5.3). Lost link headings are preprogrammed paths of flight that the MA was to take if the MC lost control (command datalink) of the MA (Tab CC-23). This change in one of the values on the presets menu uplinked all preset values to the aircraft, including the 9,000 ft minimum altitude (Tab CC-23 to CC-24, CC-16, Figure 3 and Tab CC-17, Figure 4). Once the minimum altitude of 9,000 ft MSL was uplinked, the MA began to climb from the altitude hold value of 8,500 ft MSL, and engine power increased to achieve the climb (Tab CC-23 to

Tab CC-24, Tab CC-16, Figure 3, and Tab CC-17, Figure 4). In "altitude hold" mode, the MA's autopilot maintained the higher of (a) the commanded altitude (8,500 feet MSL) or (b) the uplinked minimum altitude (9,000 feet MSL), as the MA is programmed to do (Tab CC-6).

By 22:28:44 GMT, the MA reached approximately 8,900 ft MSL when the mishap sensor operator (MSO) identified the MA was climbing and commented, "a little bit high…we're climbing" (Tab N-4, Tab CC-24, and Tab CC-9). In response to what the MC perceived to be an unexpected flight action, the MP commanded landing configuration, which put the aircraft into a manual mode of control (Tab CC-9 and Tab V-5.1). Simultaneously, the remaining two hold modes (airspeed and altitude) and stall protection were automatically turned off (Tab CC-24 and Tab CC-16, Figure 3). With the landing configuration command having turned off airspeed and altitude hold modes, the uplinked pitch angle (the angle of the MA nose, up or down) command automatically increased from 0 degrees to +9.5 degrees to match the current pitch angle (Tab CC-23). Further, engine power decreased from 100 percent to the manually commanded power level of approximately 30 percent (Tab CC-24).

With pitch angle commanded at 9.5 degrees, and airspeed decreasing due to the manual power setting, the MA began to approach a stalled condition in which the wings would not produce enough lift to keep the MA in the air (Tab CC-23). Associated yellow visual warnings regarding the MA's stall potential were displayed to the MC (Tab CC-7 and Tab CC-24). This began a 28-second period that ended with the MA departing controlled flight (Tab CC-24). During this time, a second stall warning initiated which was visual (red warning) and audible.

At 22:28:53 GMT, the MP identified the minimum altitude setting as the cause behind the unexpected climb and verbalized his intention to reset the value to 8,000 ft MSL to the MSO (Tab CC-24 and Tab CC-9). Desiring to prevent the MA from increasing speed during the descent, MP further reduced the power from 30 percent to 6 percent (Tab V-5.3). At this time, the indicated airspeed had dropped 14 knots, which was the value for stall speed for the current aircraft weight of 8,772 pounds (lbs) (Tab CC-24 and Tab CC-7).

At 22:29:05 GMT, the MC changed the minimum altitude in the presets menu from 9,000 to 8,000 ft MSL (Tab CC-24 and Tab CC-7). By this time, the indicated airspeed had dropped an additional 9 knots (Tab CC-24 and Tab CC-7). Approximately five seconds after the MC changed the minimum altitude, the aircraft began to descend, reaching a negative 1,000 ft per minute vertical speed (Tab CC-24 and Tab CC-7). At 22:29:15 GMT, the MP recognized the decreasing airspeed and increased the power level from 6 percent to 97 percent (Tab CC-24, Tab CC-8, and Tab V-5.3). Pitch angle continually decreased at which point the MA went lost return link (stopped receiving data from the MA), the MC's head up display (HUD) video froze (Tab CC-24, CC-8, and Tab CC-10), and the MC verbally identified that they were "lost link" (Tab N-5). From 22:29:15 GMT to 22:29:47 GMT, the MC received intermittent data from the MA (Tab CC-24 and Tab CC-9). An update at 22:29:33 GMT showed the attitude indicator at negative, maximum degree pitch and a significant left roll (Tab CC-24 and Tab CC-9).

e. Impact

The line of sight (LOS) link with the LRE was maintained through much of the loss of control (Tab CC-24, CC-5). At approximately 22:29:47 GMT, the MA impacted the ground in a steep, high speed dive (the clock in the HUD video froze at 22:29:21, however footage continued for approximately 26 seconds) (Tab Z-3, Tab Z-4, and Tab V-4.1).

f. Egress and Aircrew Flight Equipment (AFE)

Not applicable

g. Search and Rescue (SAR)

Not applicable

h. Recovery of Remains

Not applicable

5. MAINTENANCE

a. Forms Documentation

A review of the Integrated Maintenance Data System and Air Force Technical Order (AFTO) 781-series forms for MA up until the day of the incident revealed no relevant discrepancies (Tab D-6 to Tab D-7). A maintainer (aircraft maintenance worker) assigned to MA signed the exceptional release on 6 June 2016 to certify MA was safe for flight through 7 June 2016 (Tab D-3).

b. Inspections

The MA's AFTO Form 781H indicated the aircraft was inspected the day prior to the mishap and cleared for subsequent flights (Tab D-3). MCE also reviewed all inspection documentation prior to assuming control of MA and no discrepancies were identified (Tab V-4.1 and Tab V-5.1).

c. Maintenance Procedures

The investigation discovered no relevant deviations from maintenance procedures. All maintenance procedures were current and properly conducted IAW all applicable technical orders and guidance (Tab D-2 to D-20).

d. Maintenance Personnel and Supervision

According to the forms review, all preflight maintenance for MA was properly performed prior to the mishap flight (Tab D-3). There is no evidence that the training and qualifications of the maintenance personnel and supervision were a factor in this mishap.

e. Fuel, Hydraulic, and Oil Inspection Analyses

According to the MA's AFTO Form 781H, MA's fluid levels were properly inspected and adequate to conduct the mishap mission (Tab D-3). Due to the destruction of the MA, post-mishap fluid analysis was not conducted.

f. Unscheduled Maintenance

The MA did not undergo, nor was due for, any unscheduled maintenance based on review of applicable maintenance records (Tab D-2 to D-20).

6. AIRFRAME, MISSILE, OR SPACE VEHICLE SYSTEMS

a. Structures and Systems

Inspection of the data log analysis revealed no aircraft system malfunction, nor were systems malfunctions noted by the MC (Tabs J-6 to J-24 and Tabs V-3.1 to V-5.3).

b. Evaluation and Analysis

Technical review of data logs indicated that the aircraft was following all commands, including control stick and power commands (Tab J-6 to J-24). Based on review of engineering evaluations and GCS analysis, all systems associated with MA appeared to be functioning normally and within prescribed parameters (Tabs J-6 to J-24).

7. WEATHER

a. Forecast Weather

The forecast for the MA's operational area consisted of clear skies below 25,000 ft MSL, with light winds (Tab F-3).

b. Observed Weather

The observed weather during the mishap flight consisted of light winds and clear skies below 25,000 ft MSL (Tab F-8).

c. Space Environment

Not applicable.

d. Operations

There is no evidence to suggest MA was being operated outside its prescribed operational weather limits (Tab F-2 to F-8).

8. CREW QUALIFICATIONS

a. Mishap Pilot

The MP was current and qualified on the MQ-9A at the time of the mishap (Tab G-2). The MP had 767 hours of MQ-9A time and 451 hours of MQ-9A instructor flying time (Tab G-2). At the time of the mishap, recent flight times were as follows (Tab G-2):

	Flight Hours	Flight Sorties
Last 30 Days	16.3	7
Last 60 Days	25.1	11
Last 90 Days	31.5	14

b. Mishap Sensor Operator

The MSO was current and qualified on the MQ-9A at the time of the mishap (Tab G-9). The MSO had 2407 hours of MQ-9A time, and 175 hours of MQ-9A instructor flying time (Tab G-9). At the time of the mishap, recent flight times were as follows (Tab G-9):

	Flight Hours	Flight Sorties
Last 30 Days	10.7	5
Last 60 Days	15.8	8
Last 90 Days	26.2	14

9. MEDICAL

a. Qualifications

At the time of the mishap, MCE were medically qualified for flight duty and had current annual flight physical examinations on record (Tabs G-4 and G-10).

b. Health

Based on information provided to the AAIB, there is no evidence to suggest health factors were a factor in this mishap (Tab T-6, V-4.1 and Tab V-5.1).

c. Pathology/Toxicology

Immediately following the mishap and in accordance with safety investigation protocols, blood and urine samples were collected and submitted to the Armed Forces Medical Examiner System at Dover Air Force Base, Delaware for toxicological analysis (Tab T-3 and Tab T-5). Blood samples for MP and MSO were found to be within normal limits for carbon monoxide levels and were negative for ethanol (Tab T-2 and Tab T-4). Urine drug screen testing for MP and MSO were

negative for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, opiates, phencyclidine, and sympathomimetic amines by immunoassay or gas chromatography/ full scan-mass spectrometry (Tab T-2 and Tab T-4).

d. Lifestyle

There is no evidence to suggest lifestyle factors were a factor in the mishap (Tab T-6).

e. Crew Rest and Crew Duty Time

Aircrew members must have proper rest, as defined in AFI 11-202, Volume (V) 3, *General Flight Rules*, (ACC Supplement), dated 28 November 2012, prior to performing in-flight duties (Tab BB-4). AFI 11-202 V3 defines normal crew rest as a minimum of 12-hour non-duty period before the designated flight duty period begins, during which time an aircrew member may participate in meals, transportation, or rest (Tab BB-4). MCE met all requirements for crew rest and were within their respective crew duty days at the time of the mishap (Tab T-6, Tab V-4.1 and Tab V-5.1).

10. OPERATIONS AND SUPERVISION

a. Operations

MCE indicated the operations tempo for their unit was normal and sustainable at the time of the mishap at time of mishap as reported by their operational risk management (ORM) assessment (Tab T-6).

b. Supervision

Both MP and MSO were qualified instructors and evaluators, and no specific supervision was required for the PF (Tab T-6). Appropriate supervisors and coordinating agencies were immediately notified upon recognition of a mishap by MCE (Tab V-3.2, Tab V-4.1, and Tab V-5.2).

11. HUMAN FACTORS ANALYSIS

TASK MISPRIORITIZATION (AE 202): Task Misprioritization is a factor when the individual does not organize, based on accepted prioritization techniques, the tasks needed to manage the immediate situation (Tab BB-7). MP reported that he was working on the handover checklist, which included loss link headings (Tab V-5.2). The immediate dilemma however (reduced energy state and approaching stall) was not timely observed (Tab V-5.2 to Tab V-5.3). MP noted "I started to realize the plane was stalling while I was in the other [handover] checklist procedures … I do not recall when the AOA indications or stall reengaged … At that moment in time I was prioritizing the [handover] checklist" (Tab V-5.3).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

a. Publically Available Directives and Publications Relevant to the Mishap

(1) AFI 11-202, Volume 3, General Flight Rules (ACC Supplement), 28 November 2012
(2) AFI 51-503, Aerospace Accident Investigations, 14 April 2015
(3) AFI 51-503, ACCSUP_I, Aerospace and Ground Accidents Investigations, 5 September 2013
(4) AFI 91-204, Safety Investigations and Reports, 12 February 2014
(5) AFI 11-202, Volume 3, General Flight Rules, 13 April 2015
(6) AFI 11-2MQ-1&9, Volume 1, MQ-1&9 Aircrew Training, 23 April 2015
(7) AFI 11-2MQ-1&9, Volume 3, MQ-1 and MQ-9 Operations Procedures, 1 November 2012

NOTICE: All directives and publications listed above are available digitally on the Air Force Departmental Publishing Office website at: http://www.e-publishing.af.mil.

b. Other Directives and Publications Relevant to the Mishap

(1) T.O. 1Q-9(M)A-1, USAF Series MQ-9A Aircraft, 11 September 2015

c. Known or Suspected Deviations from Directives or Publications

Not applicable.

// SIGNED//

15 March 2017

BRETT A. WARING, Lt Col, USAF
President, Abbreviated Accident Investigation Board

STATEMENT OF OPINION

MQ-9A, T/N 10-4113
NEVADA TEST AND TRAINING RANGE
7 JUNE 2016

Under 10 U.S.C. § 2254(d) the opinion of the accident investigator as to the cause of, or the factors contributing to, the accident set forth in the accident investigation report, if any, may not be considered as evidence in any civil or criminal proceeding arising from the accident, nor may such information be considered an admission of liability of the United States or by any person referred to in those conclusions or statements.

1. OPINION SUMMARY

On 7 June 2016, at approximately 22:29:47 Greenwich Mean Time (GMT), the remotely piloted mishap aircraft (MA), a MQ-9A, tail number (T/N) 10-4113, assigned to the 432d Wing, Creech Air Force Base (AFB), Nevada (NV), and operated by the 26th Weapons Squadron (26 WPS), Nellis AFB, NV, crashed while on a proficiency flight. The MA impacted the ground on U.S. government property. The MA was destroyed at a loss of $11,063,339.00. There were no fatalities, injuries, or damage to civilian property.

The launch and recovery element (LRE) properly launched the MA and completed handover to the mishap crew (MC) at 22:27:11 GMT. At handover, airspeed and altitude hold modes were enabled and commanded altitude was 8,500 feet (ft) mean sea level (MSL). Unrecognized by the MC, the minimum altitude value in the presets menu was 9,000 ft MSL. At 22:28:19 GMT, the MC changed the lost link heading on the presets menu and began running their handover-gaining checklist. This uplinked/engaged the pre-set minimum altitude of 9,000 ft MSL, and MA began to climb from the altitude hold value of 8,500 ft MSL.

Engine power automatically increased to achieve the climb. By 22:28:44 GMT, the aircraft had reached approximately 8,900 feet MSL. The mishap sensor operator (MSO) identified that the aircraft was climbing and commented, "…a little bit high… we're climbing." In response to an unexpected flight condition, the mishap pilot (MP) commanded landing configuration, thereby turning off the remaining two hold modes (airspeed and altitude) and stall protection.

The MC identified the minimum altitude setting as the cause behind the unexpected climb and the MP verbalized his intention to reset the value to 8,000 ft MSL. To prevent the MA from increasing speed during the descent, the MP retarded the power from 30 percent to 6 percent. The indicated airspeed was at the Flight Manual value for stall speed for the current aircraft weight of 8,772 pounds (lbs).

At 22:29:05 GMT, the MC changed the minimum altitude in the presets menu. Approximately 5 seconds later, the aircraft began to descend, reaching a negative 1,000 feet per minute vertical speed. At 22:29:15 GMT, the MP recognized the decreasing airspeed and manually increased power from 6 percent to 97 percent. At 22:29:20 GMT, the MA went lost return link and the MC's

heads up display (HUD) video froze. An update at 22:29:33 GMT showed the attitude indicator at negative, maximum degree pitch and significant left roll. The LRE informed the MC that it appeared that the MA had impacted the ground (LRE video continued to display viable information via direct line-of-sight until approximately three to five seconds prior to ground impact at 22:29:47).

I find by a preponderance of the evidence that the cause of the mishap was the combination of (1) MP's misprioritization to complete the handover checklist, and (2) MP's failure to observe prior warnings of reduced energy state and stall, and timely implement stall recovery procedures.

I find by a preponderance of the evidence that the MP's loss of situational awareness was a substantially contributing factor to the mishap.

I developed my opinion by analyzing factual data from historical records, Air Force directives and guidance, engineering analysis, witness testimony, flight data, and information provided by technical experts.

2. CAUSE

I find by a preponderance of the evidence that the cause of the mishap was the combination of (1) MP's misprioritization to complete the handover checklist, and (2) MP's failure to observe prior warnings of reduced energy state and stall, and timely implement stall recovery procedures. Substantially contributing factors to this mishap include the MC's loss of situational awareness.

By commanding landing configuration, the MP was manually operating the MA. The MP was responsible for monitoring altitude and air speed. The MP was also responsible for taking precautionary measures to prevent the MA from stalling and taking corrective measures in the event the MA stalled. On two separate occasions in between 22:27:11 GMT and approximately 22:29:20 GMT, the MP received visual and audible warnings that the MA was stalling. However, the MP prioritized completing his handover checklist and increased airspeed instead of accomplishing the stall recovery checklist. As a result, the MA stalled and impacted the ground.

3. SUBSTANTIALLY CONTRIBUTING FACTORS

I find by a preponderance of the evidence that the MC's loss of situational awareness substantially contributed to this mishap.

The MC lost situational awareness on the preset minimum altitude and failed to correlate that the MC had accepted the handover of MA beneath their preset altitude. Once the MC uplinked their preset data as a part of the gaining checklist, the aircraft began a normal ascent per standard logic. However, because MC was not aware of the preset minimum altitude, MC believed the ascent to be uncommanded and initiated landing configuration in response.

4. CONCLUSION

I find by a preponderance of the evidence that the cause of the mishap was the combination of (1) MP's misprioritization to complete the handover checklist, and (2) MP's failure to observe prior warnings of reduced energy state and stall, and timely implement stall recovery procedures.

// SIGNED//

15 March 2017

BRETT A. WARING, Lt Col, USAF
President, Abbreviated Accident Investigation Board

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